No. 830,207. PATENTED SEPT. 4, 1906.

J. CLEMENT.

PERMUTATION LOCK.

APPLICATION FILED JULY 1, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

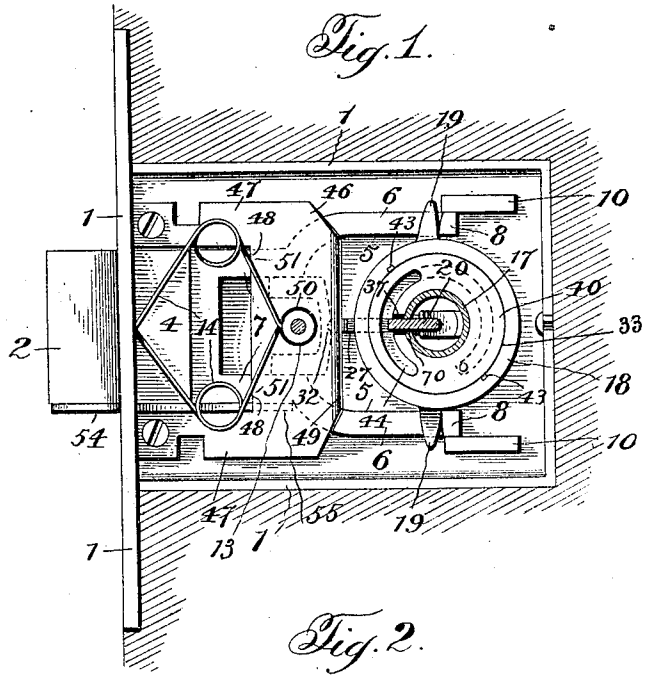
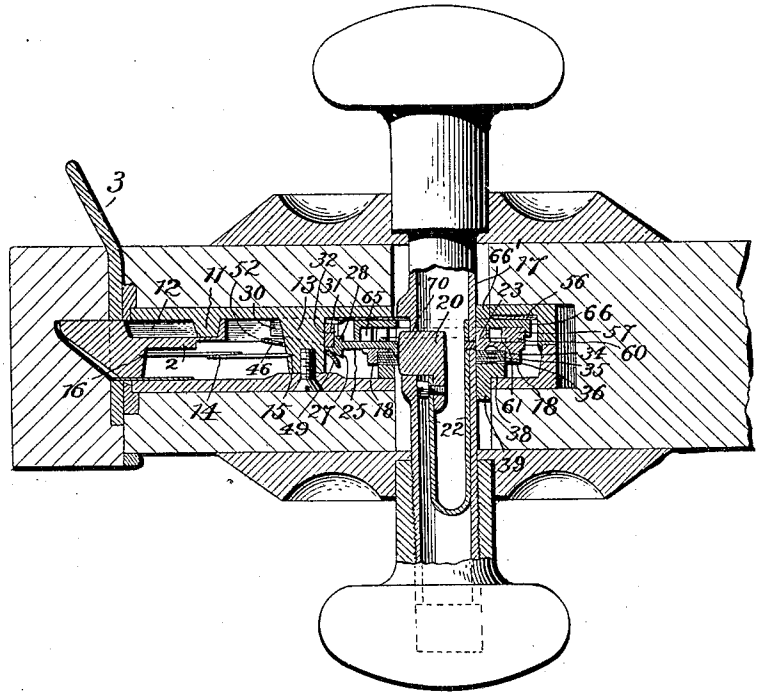


Fig. 2.



Witnesses:

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Geo. D. Riley.

Inventor:

John Clement,

By Jos. V. Hunter Attorney

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2 SHEETS—SHEET 2.

Fig. 3.

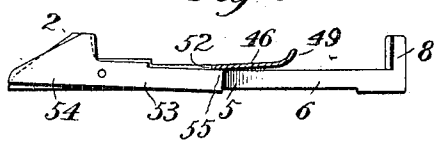


Fig. 4.

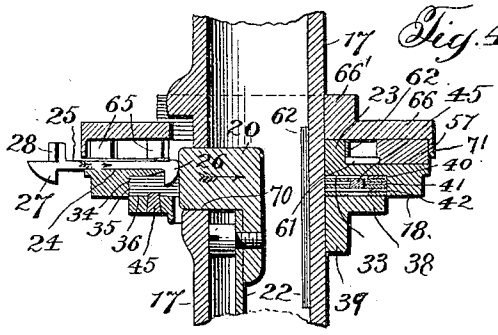


Fig. 5.

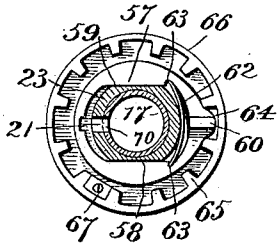


Fig. 6.

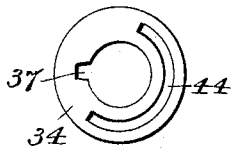


Fig. 7.

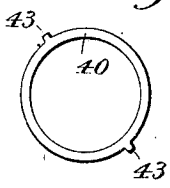


Fig. 8.

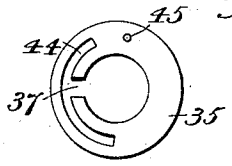


Fig. 9.

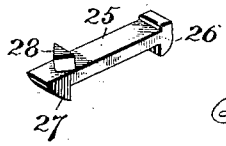


Fig. 10.

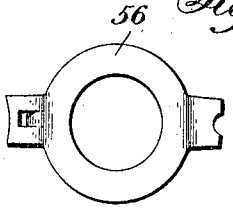
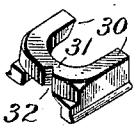


Fig. 11.



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Inventor:

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By Jos. P. Hunter Attorney:

UNITED STATES PATENT OFFICE.

JOHN CLEMENT, OF BARABOO, WISCONSIN, ASSIGNOR OF ONE-HALF TO W. H. SHUBRING, OF BARABOO, WISCONSIN.

PERMUTATION-LOCK.

No. 830,207. Specification of Letters Patent. Patented Sept. 4, 1906.

Application filed July 1, 1905. Serial No. 267,944.

To all whom it may concern.

Be it known that I, JOHN CLEMENT, a citizen of the United States, residing at Baraboo, in the county of Sauk and State of Wisconsin, have invented certain new and useful Improvements in Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to permutation-locks.

The main object of the invention is to provide improvements in combination-locks for doors or the like of such a character that the same may be operated to open the door by turning the knob-shaft in the usual manner or may be set so that the door cannot be opened except by one familiar with the combination and operation of the lock.

A convenient embodiment of the invention comprises the construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of the lock mechanism. Fig. 2 is a horizontal transverse section. Fig. 3 is a detail view showing the bolt and trigger in elevation and a portion of the latch in section. Fig. 4 is an enlarged longitudinal section of a portion of the knob-shaft and the mechanism directly associated therewith. Figs. 5, 6, 7, 8, 9, 10, and 11 are detailed views of some of the parts.

Referring to the drawings in detail, wherein like reference characters designate corresponding parts throughout the several views, 1 designates a lock-casing provided with an interior arrangement to accommodate the different instrumentalities hereinafter described. Within the casing a sliding bolt 2 is mounted, having a head at its outer end adapted to pass through one end of the casing and engage the usual striker-plate 3, arranged adjacent the lock-casing. Extending from the head of the bolt is a shank 4, the inner end of which terminates in a yoke 5, comprising opposite longitudinally-disposed arms 6, which have inner straight portions 7 and laterally-projecting engaging-lugs 8 at their outer extremities. The sliding bolt 2 is guided in its movement by lugs 10, formed on the casing, the outer ends of the arms 6 slidably engaging said lugs, and the sliding bolt 2 is further guided and its outward movement limited by a lug 11, which engages a slot 12, formed in the front face of the bolt near the head thereof. A post 13, projecting from one side of the casing in the path of the inner end of the shank 4, serves to limit the inward movement of the bolt 2, which is normally impelled to its outermost position by bow-springs 14, the ends of which are seated in recesses 15 and 16, formed in the post and the bolt-head.

Extending transversely through the casing is a hollow cylindrical knob-shaft 17, on which is mounted a bolt-operating disk 18, provided with a central circular opening of a size corresponding to the size of the knob-shaft, so that the knob-shaft may have an independent rotary movement relative to the bolt-operating disk. The bolt-operating disk, which is provided with a collar 23 and oppositely-disposed ears 19, with engaging edges to bear upon the lugs 8 at the outer extremities of the opposite longitudinally-disposed arms 6, is adapted to be locked to the knob-shaft 17 by a sliding detent 20, which engages a notch 21, formed in said bolt-operating disk and its collar 23, and when this relation exists the bolt 2 may be retracted, as is obvious, by turning the knob-shaft in the usual manner. The sliding detent 20 works in a longitudinal slot 70, formed in the hollow knob-shaft, and is normally impelled to project without the hollow knob-shaft by a spring 22, located within the hollow knob-shaft, to which one end of said spring 22 is secured, the opposite end of the spring being fastened to the sliding detent 20. One side face of the bolt-operating disk 18 is slotted at 24 coincident with the notch 21 to form a way for a sliding dog 25, which is provided at its inner end with a laterally-projecting lug 26 and at its outer end with a beveled head 27 and a triangular-shaped lug 28. A sliding contact member of approximate U-shaped form, comprising the arms 30 and the portion 31, is arranged with its arms on either side of the post 13 in sliding engagement with the inner straight portions 7 of the arms 6 of the yoke 5, and the ends of the arms 30 extend to the front of the post 13 in the path of movement of the inner end of the shank 4. The portion 31 of the sliding contact member lies adjacent the lug 28 of the dog 25 and

is provided with a seat 32, corresponding to the shape of the lug 28, with which the lug engages.

Movably seated in a circular recess 33, formed in the bolt-operating disk 18, are three rotary tumbler-disks 34 35 36, provided with circular openings and notches 37, similar to the circular opening and notch 21 of the bolt-operating disk. Next to the bolt-operating disk is mounted on the knob-shaft to rotate therewith a disk 38, which is provided with a collar 39, that snugly fits and rotates in an opening in one side of the casing. Spacing-rings 40 41 42, provided with tongues 43, which engage notches formed in the side walls of the circular recess 33, are interposed between the rotary tumbler-disks 34 35 36 and the disk 18. The rotary tumbler-disks 34 35 36 are further provided with segmental slots 44, and the tumbler-disks 35 and 36 and the disk 38 are provided with pins 45. The notches 37 of the rotary tumbler-disks are in alinement with the notch 21 of the bolt-operating disk 18 and engaged by the sliding detent 20 when the bolt-operating disk 18 is locked to the knob-shaft; but when the sliding detent 20 has been disengaged from the notch 21 of the bolt-operating member 18 in a manner hereinafter described the rotary tumbler-disks 34 35 36 are adapted to be operated successively by turning the knob-shaft through the medium of the disk 38 and the pins 45, which project within the segmental slots 44 of the rotary tumbler-disks.

46 designates a latch member for the purpose of locking the bolt 2 in its outermost position and consists of the spring-arms 47, which straddle the shank 4 of the bolt and are secured at their outer ends to the lock-casing, and the portion 48, having the upturned edge 49 and an opening 50 to allow the passage of the post 13. The spring-arms 47 normally tend to force the portion 48 against the side of the bolt 2, and the edge 51 of the portion 48 is adapted to engage shoulders 52 on the arms 6, said shoulders 52 being in a position to be engaged by the latch member 46 when the bolt is in its outermost position. When the bolt-operating disk 18 is locked to the knob-shaft by the sliding detent 20, the dog 25 is held out by the said sliding detent 20 and the beveled head 27 of the dog engages the upturned edge 49 of the portion 48 to hold the latch member 46 elevated out of engagement with the shoulders 52, so that the bolt 2 is not locked. When it is desired to lock the bolt and set the lock, the bolt-head is pressed within the casing, so that the inner end of the shank 4 engages the outer ends of the arms 30 of the sliding contact member, and the dog 25 is forced inward to depress the sliding detent 20. When the bolt has reached the limit of its inward movement and is held by the operator in its innermost position, the sliding detent 20 is held depressed out of engagement with the notch of the bolt-operating disk, and, as will be obvious, the bolt-operating disk will be held stationary. The knob-shaft is then turned to move the sliding detent 20 out of alinement with the notch of the bolt-operating disk and to transmit motion to one or more of the rotary tumbler-disks to throw their notches out of alinement, so that the sliding detent 20 will be held in its depressed position. As soon as the operator releases the bolt 2 and it reaches its outermost position it is locked by the latch member 46, which has been released by the inward movement of the dog 25, and the bolt-operating disk is held stationary by the engagement of the lugs 8 with the oppositely-disposed ears 19. In order to disengage the latch member 46 from the bolt 2 to permit the same to be retracted in closing the door, I provide a trigger 53, which is pivoted to the bolt and lies adjacent its bottom face. The outer end of the trigger 53 is provided with a beveled head 54, which is held slightly in front of the head of the bolt 2 by the portion 48, which engages the inner end 55 of said trigger, so that the beveled head 54 of the trigger 53 engages the striker-plate 3 in advance of the head of the bolt 2, whereby the inner end 55 of the trigger is moved to elevate the portion 48 of the sliding latch member 46 to release the bolt.

Mounted to slide across the face of the bolt-operating disk 18 is a ring-shaped pawl 57, provided with straight surfaces 58, arranged in sliding contact with straight surfaces 59 on the collar 23 and with a lug 60, which engages a slot 61 in the face of the bolt-operating disk. A flat spring 62, bearing at its central portion against the collar 23 and having its ends seated in recesses 63, formed in the pawl 57, normally holds said pawl in the position shown in Fig. 5. The pawl 57 is provided with an outwardly-projecting toe 64, provided with a curved surface and is adapted to coöperate with an indicator-cap 66, which is keyed to the knob-shaft adjacent the bolt-operating disk 18 and is provided with a collar 66′ to snugly fit and rotate in an opening in one side of the casing. Projecting from one side of the indicator-cap and toward the bolt-operating disk is an annular flange 71, which is provided on its inner periphery with spaced teeth 65, having slightly-inclined side surfaces.

56 designates a spring-washer interposed between the indicator-cap 66 and one side of the casing to hold the several disks that are mounted on the hollow knob-shaft in operative relation.

When the bolt-operating disk is held stationary and the indicator-cap slowly rotated through the medium of the knob-shaft, the teeth 65 engage the curved surface of the toe

of the pawl 57, gradually retracting the pawl against the action of its spring 62, and as each tooth passes the center of the curved surface of the toe 64 the pawl, impelled outwardly by the spring 62, acts to push the tooth past it and give a slight impetus to the indicator-cap as the toe on the pawl moves into the adjacent space, causing a slight jolt or jar to be transmitted to the knob-shaft, to which the indicator-cap is keyed. The space between two of the teeth 65 is bridged over by a removable plug 67 for a purpose hereinafter explained.

When the sliding detent 20 is held out of engagement with the bolt-operating disk by the rotary tumbler-disks and the bolt locked in its outermost position and it is desired to unlock the bolt, the knob-shaft is turned until the removable plug 67 is brought into engagement with the curved surface of the toe 64 of the pawl 57, the operator being apprised when this relation exists by the ceasing of the slight jars caused by the pawl 57. The operator then turns the knob-shaft to successively bring the notches of the rotary tumbler-disks into alinement with the sliding detent 20, the slight jars caused by the pawl 57, which are felt by the hand of the operator on the knob-shaft, acting as signals to the operator, who turns the knob-shaft the required number of signals in both directions. As will be seen, the combination may be readily changed by changing the position of the removable plug.

From the foregoing description it will be obvious that the indicator mechanism is substantially noiseless in operation, and the latter can be operated by one familiar with the combination and operation of the same in the dark as well as in the light, the operator depending solely upon his sense of touch for perceiving the signals.

It will be understood that various changes in the construction and arrangement of parts hereinbefore described within the scope of the appended claims may be made without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is—

1. In a device of the class described, a sliding bolt having a yoke at its inner end, a knob-shaft, a bolt-operating disk provided with a notch and mounted loosely on said knob-shaft to actuate said yoke, a sliding detent mounted in a slot in the knob-shaft to engage said notch, a sliding dog mounted in said bolt-operating disk, and a sliding contact member arranged in the path of movement of the shank of the bolt.

2. In a device of the class described, a movable bolt, a knob-shaft, a bolt-operating disk provided with a notch and loosely mounted on the knob-shaft, a sliding detent working in a slot in the knob-shaft to engage the notch of the bolt-operating disk to lock the same to the knob-shaft, a sliding dog mounted in the bolt-operating disk, a sliding contact member arranged in the path of movement of the shank of the bolt, means for retaining the sliding detent out of engagement with the notch of the bolt-operating disk and a latch for the bolt held out of engagement with the same when the sliding detent engages the notch in the bolt-operating disk and released to lock the bolt when the sliding detent is disengaged from the notch of the bolt-operating disk.

3. In a device of the class described, a movable bolt, a knob-shaft, a bolt-operating disk provided with a notch and loosely mounted on the knob-shaft, a sliding detent working in a slot in the knob-shaft to engage the notch of the bolt-operating disk to lock the same to the knob-shaft, means for disengaging the sliding detent from the notch of the knob-shaft, a sliding dog mounted in the bolt-operating disk, a sliding contact member arranged in the path of movement of the shank of the bolt, means for retaining the sliding detent out of engagement with the notch of the bolt-operating disk and a spring-latch for the bolt held out of engagement with the same by the sliding dog when the sliding detent is engaged with the notch in the bolt-operating disk and released to lock the bolt when the sliding detent is disengaged from the notch of the bolt-operating disk.

4. In a device of the class described, a movable bolt, a knob-shaft, a bolt-operating disk provided with a notch and loosely mounted on the knob-shaft, a sliding detent working in a slot in the knob-shaft to engage the notch of the bolt-operating disk to lock the same to the knob-shaft, means for disengaging the sliding detent from the notch of the knob-shaft, rotary tumblers mounted in the bolt-operating disk and provided with segmental slots and pins and a disk mounted on the knob-shaft to rotate therewith adjacent the rotary tumblers to transmit motion to the same.

5. In a device of the class described, a movable bolt, a knob-shaft, a bolt-operating disk provided with a notch and loosely mounted on the knob-shaft, a sliding detent working in a slot in the knob-shaft to engage the notch of the bolt-operating disk to lock the same to the knob-shaft, means for disengaging the sliding detent from the notch of the knob-shaft, rotary tumbler-disks mounted in the bolt-operating disk provided with segmental slots and pins, a disk mounted on the knob-shaft to rotate therewith adjacent the rotary tumbler-disks to transmit motion to the same and provided with a pin and spacing-rings interposed between the rotary tumbler-disks and the last-mentioned disk.

6. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member carried by the knob-

shaft, locking means for operatively connecting the bolt-operating member with the knob-shaft, tumbler-disks adapted to hold said locking means out of engagement with the bolt-operating member, a spring-latch for the bolt held out of engagement with the same when the knob-shaft is locked to the bolt-operating member and released to lock the bolt when the knob-shaft is unlocked from the bolt-operating member and a trigger pivoted to the bolt to engage the striker-plate in advance of the bolt-head to release the spring-latch.

7. In a device of the class described, the combination of a movable bolt, a knob-shaft held from movement in the direction of its length, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft and tumbler members adapted to hold said locking means out of operative relation with the bolt-operating member.

8. In a device of the class described, the combination of a movable bolt, a knob-shaft held from movement in the direction of its length, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism for disengaging said locking means, and tumbler members adapted to hold said locking means out of operative relation with the bolt-operating member.

9. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, tumblers to hold said locking means out of operative relation with the bolt-operating member, and indicating means comprising a disk fast to the knob-shaft and provided with teeth and a pawl for coöperation therewith.

10. In a device of the class described, a movable bolt, a knob-shaft, a bolt-operating disk provided with a notch and mounted loosely on said knob-shaft, a sliding detent mounted in the slot in the knob-shaft to engage said notch, a sliding dog mounted in said bolt-operating disk, a sliding contact member arranged in the path of movement of the rear end of the shank of the bolt and in engagement with the front end of the sliding dog, rotary tumblers adapted to retain the sliding key out of engagement with the bolt-operating disk, and a member mounted on the knob-shaft to rotate therewith adjacent the rotary tumblers to transmit motion to the same.

11. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism for disengaging said locking means, tumbler members adapted to be operated by the knob-shaft and to hold said locking means out of engagement with the bolt-operating member, and substantially noiseless concealed mechanism for indicating the operation of the knob-shaft in moving the tumblers to release the locking means.

12. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism for disengaging said locking means, tumbler members adapted to be operated by the knob-shaft and to hold said locking means out of engagement with the bolt-operating member, and means independent of the tumbler members for indicating the operation of the knob-shaft in moving the tumblers to release the locking means.

13. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism for disengaging said locking means, tumbler members adapted to be operated by the knob-shaft and to hold said locking means out of engagement with the bolt-operating member, and indicating means comprising a pawl and ratchet, substantially noiseless in operation and for the purpose of causing a slight jar to the knob-shaft as the same is turned through each stroke of the combination.

14. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, tumblers to hold said locking means out of engagement with the bolt-operating member, and indicating means comprising a disk fast to the knob-shaft and provided with teeth, and a spring-pressed sliding pawl having a toe provided with a curved surface for coöperation with the teeth of the last-mentioned disk.

15. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, tumblers to hold said locking means out of engagement with the bolt-operating member, and indicating means comprising a disk fast to the knob-shaft and provided with teeth, and a pawl to coöperate with the teeth of said disk, carried by the bolt-operating member and having a sliding movement independent thereof.

16. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the knob-shaft with the bolt-operating member, mechanism for disengaging said locking means, tumbler

members to hold said locking means out of engagement with the bolt-operating member, and a member fast to the knob-shaft to transmit motion to the tumblers.

17. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, and mechanism adapted to be operated by the movable bolt to disengage said locking means.

18. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism adapted to be operated by the movable bolt to disengage said locking means, and means adapted to hold said locking means out of engagement with the bolt-operating member.

19. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, and mechanism for disengaging said locking means including a movable member arranged to be operated by the movable bolt.

20. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, and mechanism for disengaging said locking means including a sliding contact member arranged to be operated by the movable bolt.

21. In a device of the class described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, and mechanism including a movable dog and a movable member, said movable member being adapted to be operated by the movable bolt to cause the movable dog to disengage the locking means.

22. In a device of the character described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, and mechanism for disengaging said locking means including a sliding dog and a sliding contact member, said sliding contact member being arranged to be operated by the movable bolt.

23. In a device of the character described, the combination of a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, mechanism including a dog movable with the bolt-operating member and adapted to have independent movement relative thereto, and a movable contact member, said movable contact member being adapted to be operated by the movable bolt.

24. In a device of the class described, the combination with a movable bolt, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, means for disengaging the locking means from the bolt-operating member, means for holding said locking means out of engagement with the bolt-operating member, and instrumentalities whereby the movable bolt will be stayed from movement in its outermost position when the locking means is out of engagement with the bolt-operating member and be free to move when the locking means is in engagement with the bolt-operating member.

25. In a device of the class described, the combination of a movable member, a knob-shaft, a bolt-operating member, locking means for operatively connecting the bolt-operating member with the knob-shaft, means for disengaging the locking means from the bolt-operating member, a latch to lock the movable bolt when the latter is in its outermost position, and means coöperating with the locking means whereby the latch will be held out of engagement with the movable bolt when the locking means is in engagement with the bolt-operating member.

26. In a device of the class described, the combination of a striker-plate, a movable bolt, means acting to impel the bolt to its outermost position, a knob-shaft, a bolt-operating member, locking means for opertively connecting the bolt-operating member with the knob-shaft, means for disengaging the locking means from the bolt-operating member, means for holding said locking means out of engagement with the bolt-operating member, a latch to lock the bolt from movement when the bolt is in its outermost position, and a member mounted on the bolt to engage the striker-plate in advance of the bolt to release the latch.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN CLEMENT.

Witnesses:
F. A. PHILBRICK,
ARTHUR SCHADE.